



United States  
Department of  
Agriculture  
Forest Service

## FOREST PEST MANAGEMENT

### Technology Update

Southern Region U.S.D.A. Forest Service, 20 Peachtree Rd., N.W., Atlanta, Ga. 30367

#### Southern Pine Beetle Fact Sheet Number 28

##### TEXAS HAZARD RATING GUIDE

Rating forest stand susceptibility to the southern pine beetle (SPB) serves many purposes, from providing a better understanding of resource inventory and management needs, to directly or indirectly reducing SPB suppression costs. SPB Fact Sheet No. 10 summarizes several risk rating systems for pine stands in the South.

This fact sheet describes the Texas Hazard Rating System. The system has also been verified for use in Louisiana and may be useful in other Gulf Coast areas where similar conditions exist.

##### The Texas System

A relationship between pine basal area per acre, average stand height, landform (representing general moisture regime), and SPB occurrence was developed from stand and historical records in east Texas.

Code values from appropriate stand and landform categories from table 1 are entered into the equation:

$$\text{HAZ} = -5.90 + 1.09 \text{ BAC} + .65 \text{ HTC} + .56 \text{ LDC}$$

Where: HAZ = stand hazard rating,  
BAC = basal area code,  
HTC = height code, and  
LDC = landform code (table 1)

Table 1. Categories and codes for SPB hazard ratings.

Codes (BAC, HTC, LDC)*	Pine basal area/acre	Average stand height	Landform
1	<40	<50	Ridge
2	41 - 80	51 - 75	Other
3	81 - 120	76 - 100	Bottom
4	>120	>100	---

\* Use appropriate code for each category.

Calculated values relating to hazard classes are presented below:

HAZ VALUE	STAND HAZARD RATING
<-1.82	LOW
-1.82 to + 0.54	MEDIUM
> 0.54	HIGH

For a 5-class System

HAZ VALUE	STAND HAZARD RATING
<-1.82	VERY LOW
- 1.82 to -0.59	LOW
- 0.59 to + 0.54	MEDIUM
0.54 to 1.12	HIGH
> 1.12	VERY HIGH

##### EXAMPLE:

If a stand has an average pine basal area per acre of 100 square feet, a height of about 60 feet, and is located on a low lying pine site, the rating calculation is as follows:

$$-5.90 + 1.09 (3) + .65 (2) + .56 (3) = .35$$

.35 = medium hazard



## Application Methods

There are several ways that hazard ratings can be applied to a forest ownership, depending on the availability of resource data and land management objectives. Some of these approaches are described below.

Using existing computerized inventory data--Large land bases of managed forest lands can be rated using existing inventory records. Minor modification of rating system category classes to conform to inventory values can be made with little effect on ratings.

Using existing inventory maps or aerial photos--When classification categories are sufficiently broad to allow extraction of rating information directly from inventory maps or aerial photographs, the actual rating can be obtained by directly using the equation, table 2<sup>1/</sup>, or the Texas SPB Hazard Rating Guide.

Using ground cruise data--Stands can be rated in the field using table 2 or the

Texas SPB Hazard Rating Guide and information gathered through timber inventory activities or field checks. Take care to collect adequate data to represent the entire stand rather than isolated "pocket conditions."

## Interpretation of Ratings

Stand hazard ratings identify a relationship between certain site and stand conditions and the likelihood of SPB attack under those conditions. These ratings provide valuable guidelines for operations and planning activity. However, stands which meet the criteria of "low risk" may very well incur infestations some time in the future, especially under periods of tree stress or high beetle population levels. Similarly, some "high hazard" stands may escape attack, even during periods of high beetle activity. Overall, average timber and value losses will be greater in high hazard areas.

Table 2. Hazard rating classes

Stand Height (ft)		Pine basal area/acre (ft <sup>2</sup> )			
		40	41-80	81-120	120
<50	Ridge	Very low	Very low	Low	Low
	Side slope	Very low	Low	Low	Medium
	Bottom	Very low	Low	Medium	Medium
51-75	Ridge	Very low	Low	Low	Medium
	Side slope	Very low	Low	Medium	High
	Bottom	Very low	Low	Medium	Very high
76-100	Ridge	Very low	Low	Medium	High
	Side slope	Low	Low	Medium	Very high
	Bottom	Low	Medium	High	Very high
>100	Ridge	Low	Low	Medium	Very high
	Side slope	Low	Medium	Very high	Very high
	Bottom	Low	Medium	Very high	Very high

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<sup>1/</sup> This circular slide rule is available from: USDA Forest Service, Forest Pest Management, 2500 Shreveport Highway, Pineville, La. 71360; Stephen F. Austin State University, School of Forestry, Nacogdoches, Tex. 75962; or the Texas Forest Service, Lufkin, Tex.